To: Elias, Mike[Elias.Mike@epa.gov]; Greg Smith[gsmith@glec.com]
From: Craig Voros
Sent: Wed 3/16/2016 3:03:52 PM
Subject: Re: FW: Cd GLEC tasks/discussion
comparison.docx

After trying, I can create a "compared version" and save it with a new name. See attached for what it looks like, ignore the substance though since I just grabbed to random versions.

So, for COB today we will have a clean version of what is currently dated 3.11.16 and a new compared file. The compared file is a comparison of the clean version and the file that was in the docket for public review. Correct?

Craig Voros
Great Lakes Environmental Center
1295 King Avenue
Columbus, OH 43212
614-487-1040

On 3/16/2016 10:16 AM, Elias, Mike wrote:

> Thank you Greg.
>
> Also, I was just told that the division director is primarily going to look at the revisions made based on public comments and the final agency review. So, for the deliverable today, could you please provide me with a change accepted version and a document compare version, that compares with the clean version sent for public comment?
>
> **From:** Greg Smith [mailto:gsmith@glec.com]
> **Sent:** Wednesday, March 16, 2016 10:07 AM
> **To:** Elias, Mike <Elias.Mike@epa.gov>; Craig Voros <cvoros@glec.com>
> **Subject:** Re: FW: Cd GLEC tasks/discussion
>
> Mike
>
> Yes, we plan to add them to the appropriate appendix.
>
> Thanks
> Greg

On 3/16/2016 9:21 AM, Elias, Mike wrote:

> I just noticed that Kathryn asked for a table of conversion factors for standard hardness levels, for acute and chronic. Did not see that previously. Could you please add these tables. So we don't disrupt the table order at this point, they could be added to the corresponding appendices for acute and chronic.

From: Craig Voros [mailto:cvoros@glec.com]
Sent: Wednesday, March 16, 2016 7:41 AM
To: Elias, Mike <Elias.Mike@epa.gov>; Greg Smith <gsmith@glec.com>
Subject: Re: FW: Cd GLEC tasks/discussion

The document is still in the QA review process. I expect that he will be done midday. I believe the budget update does include the weekend, but I will double-check with Greg when he gets in. So pending no major issues, all I have to do is update the TOC, incorporate any QA issues and will have a red-line version complete by COB.

Sound good?

Craig Voros Great Lakes Environmental Center 1295 King Avenue Columbus, OH 43212 614-487-1040

On 3/16/2016 7:16 AM, Elias, Mike wrote:

> Greg and Craig,
>
> I wanted to update you and check on status. I am working out of the office today based on the shutdown of the metro system in dc, but will be oAnline and accessible by cell phone.
>
> I am working on making my edits to the document on Sharepoint and expect to finish this morning. My edits are all minor in nature…mostly adding limited text. Could you please let me know your status with the document and the QA, and if we are on track for having the document ready for review (based on the assumption that I will be out of it by noon today).

On a related note, is the budget update that you provided me on Monday accounting for work done over the weekend?

Thanks,

Mike

From: Greg Smith [mailto:gsmith@glec.com]
Sent: Monday, March 14, 2016 2:35 PM
To: Elias, Mike <Elias.Mike@epa.gov>
Cc: Craig Voros <cvoros@glec.com>
Subject: Re: FW: Cd GLEC tasks/discussion

Now is good

On 3/14/2016 2:31 PM, Elias, Mike wrote:

> I just have one spreadsheet that I need to talk through with a few questions: Appendix A Acute Toxicity. All others are clear to me. When would you have some time to talk?
>
> **From:** Greg Smith [mailto:gsmith@glec.com]
> **Sent:** Monday, March 14, 2016 2:02 PM
> **To:** Elias, Mike <Elias.Mike@epa.gov>
> **Cc:** Craig Voros <cvoros@glec.com>
> **Subject:** Re: FW: Cd GLEC tasks/discussion
>
> Thanks Mike. Will do

On 3/14/2016 1:52 PM, Elias, Mike wrote:

> Greg, Your proposed edits look good. Please go ahead and add as they are. Thanks.

From: Greg Smith [mailto:gsmith@glec.com]
Sent: Monday, March 14, 2016 12:52 PM
To: Elias, Mike <Elias.Mike@epa.gov>
Cc: Craig Voros <cvoros@glec.com>
Subject: Re: FW: Cd GLEC tasks/discussion

Mike

Here is the file containing our responses to the Agency comments (that you highlighted in yellow for us to address).

Just call if you have any questions.

Thanks
Greg

On 3/14/2016 11:26 AM, Elias, Mike wrote:

> Greg, Kathryn and I are talking, so I will be delayed for a few mins, but will give you a call after.

From: Greg Smith [mailto:gsmith@glec.com]
Sent: Monday, March 14, 2016 11:05 AM
To: Elias, Mike <Elias.Mike@epa.gov>
Subject: Re: FW: Cd GLEC tasks/discussion

Yes

On 3/14/2016 11:02 AM, Elias, Mike wrote:

> Greg, Are you available for a 5 min touching base?
>
> **From:** Greg Smith [mailto:gsmith@glec.com]
> **Sent:** Sunday, March 13, 2016 4:36 PM
> **To:** Elias, Mike <Elias.Mike@epa.gov>
> **Cc:** Craig Voros <cvoros@glec.com>
> **Subject:** Re: FW: Cd GLEC tasks/discussion
>
> Hi Mike
>
> Yes, Hollis et al. (2000a) was not used in the rainbow trout SMAV, and the numbers below reflect this.
>
> Greg
>
> On 3/13/2016 2:16 PM, Elias, Mike wrote:
>
> > Thanks. I am using these numbers as the most updated for my briefing. Please let me know if there are any changes. I saw the messages from Kathryn and confirmation from Luis about removing Hollis 2000a from the SMAV. Based on the time stamps of the messages, I assume the numbers below reflect this correctly, but just wanted to confirm.
> >
> > **From:** Greg Smith [mailto:gsmith@glec.com]
> > **Sent:** Friday, March 11, 2016 3:20 PM

To: Elias, Mike <Elias.Mike@epa.gov>
Cc: Craig Voros <cvoros@glec.com>
Subject: Re: FW: Cd GLEC tasks/discussion

Mike

We have finished revising the acute data (using the new acute slope of 0.9789), and have also updated the chronic database (now includes the Cottus 21-day study).

So here are the criteria (please pass this onto the others):

FW Acute: CMC = 1.9 ug/L total cadmium at a TH of 100 mg/L (lowered to protect RBT; SMAV = 3.727)
CMC = 1.8 ug/L dissolved cadmium at a TH of 100 mg/L

Equation: CMC = e^(0.9789*ln(hardness)-3.866)

FW Chronic: CCC = 0.79 ug/L total cadmium at a TH of 100 mg/L
CCC = 0.72 ug/L dissolved cadmium at a TH of 100 mg/L

Equation: CCC = e^(0.7977*ln(hardness)-3.909)

SW Acute: CMC = 33 ug/L total cadmium
CMC = 33 ug/L dissolved cadmium

SW Chronic: CCC = 8.0 ug/L total cadmium
CCC = 7.9 ug/L dissolved cadmium

And just to verify,
the version on SharePoint that we will update (make changes) is in the: "GLEC/Final Document" folder
and the file is called "Draft Cadmium Aquatic Life Ambient Water Quality Criteria 2 26 16-(REDLINE)"

Thanks
Greg

On 3/11/2016 10:48 AM, Elias, Mike wrote:

> Greg, I am briefing the division director Monday morning. Could you please let me know how the chronic value changes once the cottus 21 day study is put back in before that time? I just need the number. Thanks.

From: Greg Smith [mailto:gsmith@glec.com]
Sent: Friday, March 11, 2016 9:41 AM
To: Cruz, Luis <Cruz.Luis@epa.gov>; Craig Voros <cvoros@glec.com>; Doug Endicott <dendicott@glec.com>
Cc: Elias, Mike <Elias.Mike@epa.gov>; Justice, JamesR <Justice.JamesR@epa.gov>; Gallagher, Kathryn <Gallagher.Kathryn@epa.gov>
Subject: Re: FW: Cd GLEC tasks/discussion

Hi all

As we work through updating the database with the new slope, we noticed that the RBT study by Hollis et al. 2000a (that dosed with cadmium nitrate) that we removed from the SMAV calculation for RBT now has a normalized acute value of 10.0 (was 12.21). This study was also removed from the slope analysis.

With this new acute value of 10.0, it is now within a factor of 10x relative to the lowest one at 1.23.

So was a justification found to exclude the RBT studies that used cadmium nitrate? Or do we now include it in the SMAV calculation for RBT, pending we have some justification that it was not used in the acute hardness dataset?

Thanks
Greg

On 3/10/2016 4:33 PM, Cruz, Luis wrote:

> Hi,
>
> After the initial slope analysis please continue as follows
>
> •□□□□□□□□ Use the new slope (removing the 4 values from RBT and all the unmeasured studies, the acute pooled slope is 0.9789. (n=80, for 13 species) to recalculate the acute criteria.
>
> •□□□□□□□□ Report data and criteria normalized to hardness of 100.

•□□□□□□□ Send the results to EPA WAM by Monday morning

Then,

•□□□□□□□ Correct the criteria document values

•□□□□□□□ Correct the chronic by adding back in the 21-day Cottus study.

Thanks

From: Cruz, Luis
Sent: Thursday, March 10, 2016 3:27 PM
To: Gallagher, Kathryn <Gallagher.Kathryn@epa.gov>
Subject: FW: Cd GLEC tasks/discussion

Kathryn,

After removing the data the pooled slope changed from 1.103 to 0 0.9789. But still around 1. If this change enough to go ahead and redo data normalization?

From: Craig Voros [mailto:cvoros@glec.com]
Sent: Thursday, March 10, 2016 2:31 PM
To: Cruz, Luis <Cruz.Luis@epa.gov>; Doug Endicott <dendicott@glec.com>; Greg Smith <gsmith@glec.com>
Cc: Elias, Mike <Elias.Mike@epa.gov>; Justice, JamesR <Justice.JamesR@epa.gov>; Gallagher, Kathryn <Gallagher.Kathryn@epa.gov>
Subject: Re: Cd GLEC tasks/discussion

Okay, Keith ran the acute hardness slope analysis you requested.

The original acute pooled slope is 1.103. Removing the 4 values from RBT, the acute pooled slope is 1.088. (n=111, for 20 species) Removing the 4 values from RBT and all the unmeasured studies, the acute pooled slope is 0.9789. (n=80, for 13 species)

There is no significant species interaction term in the new models.

Please give us a call when you get a chance to discuss how to proceed.
Thanks,

Craig Voros Great Lakes Environmental Center 1295 King Avenue Columbus, OH 43212 614-487-1040

On 3/10/2016 1:11 PM, Cruz, Luis wrote:

> Hello,
>
> Doug is GLEC Work Assignment Leader. As per our phone conversation this morning these are the tasks we talked about regarding Task 3 (Updating Cd criteria) of WA 1-05 and they constitute technical directives.
>
> 1) <u>For the criteria driver rainbow trout data:</u>
>
> a. Please exclude the data point "greater than" 6.X value from the calculation, since it will bias the value high.
>
> b. The other primary issue, as pointed out to us by peer reviewer and public commenter Chris Mebane, was that we had a greater than 10-fold difference across rainbow trout acute results in the

draft (~1-15 ug/L), so we needed to examine that data for issues and **outliers**. We agreed that we should remove the Davies 1993 (1.164 value) at very high hardness (>400) due to the influence of the ionic ratios as result of increasing the hardness, as Jim noted. There was an excess of Mg, such that the Ca:Mg ratio was not appropriate for the test, thus lowering the LC50 value inappropriately, because the protective decrease in toxicity from high calcium-driven hardness is not accurately reflected in the data.

c. Please also remove the high end outliers, that are outside the 10-fold range for a species SMAV per the Guidelines. Also these high end tests were the only tests with calcium nitrate, and we suspect that the cadmium nitrate salts may somehow be affecting toxicity different than the other Cd salts (chloride and sulfate). These studies are the Hollis 1999 (15.18 value), Hollis 2000a (12.21 value), and Niyogi 2004b (15.53 value).

2) For the hardness equation.

a. Remove these rainbow trout studies discussed from the hardness equation (Davies, 1993 H>400, Hollis 1999, 2000a, Niyogi 2004b), since if we suspect these data are off, we should not use them to correct for hardness.

b. Examine whether removing the unmeasured hardness equation tests and recalculate with removal data is sufficient. We know is typical practice to include unmeasured data, but we are concerned with using unmeasured values to correct for hardness in the criteria equation.

3) Please bring back in the Cottus 21 day chronic test discussed with Chris Mebane because of it being the most sensitive test for the species. Should be averaged with the 28 day test.

We need to have the new criteria values (acute and chronic) and hardness equation in hand by Monday. Then, the other non-criteria-driving values in the document can be corrected by next Thursday afternoon.